

# WORKER SAFETY AND FIRE PROTECTION

Testimony of Geoff Lesh, PE, and Rick Tyler

## SUMMARY OF CONCLUSIONS

---

Staff has reviewed the Hidden Hills Solar Energy Generation Project (HHSEGS or proposed project) in accordance with the requirements of the California Environmental Quality Act (CEQA). With respect to CEQA, staff concludes that if the applicant for the proposed HHSEGS project provides a Project Construction Safety and Health Program and a Project Operations and Maintenance Safety and Health Program, as required by Conditions of Certification **WORKER SAFETY-1** and **-2** and fulfils the requirements of Conditions of Certification **WORKER SAFETY-3** through **-5** the project would incorporate sufficient measures to ensure adequate levels of industrial safety and comply with applicable laws, ordinances, regulations, and standards.

The proposed conditions of certification provide assurance that the Construction Safety and Health Program and the Operations and Maintenance Safety and Health Program proposed by the applicant would be reviewed by the appropriate agency before implementation. The conditions also require verification that the proposed plans adequately assure worker safety and on-site fire protection and comply with applicable laws, ordinances, regulations, and standards.

Staff has considered the position of the Southern Inyo Fire Protection District (SIFPD) and all relevant information as well as past experience at other solar power plants in California. SIFPD resources (both personnel and equipment) are limited commensurate with the low population density of the area it serves. The SIFPD has indicated, before the recent project changes that effectively doubled the construction workforce and associated traffic, that emergency services would be significantly impacted (SIFPD 2012a) because of the magnitude of the proposed project and the large (relative to local population) workforce. The potential for unmitigated impacts resulting from new demands for SIFPD services as a result of construction and operation of HHSEGS is increased by the fire district not being financially supported by county revenues, and thus would not benefit from any taxes paid to the county.

Due to the minimal resources of the local SIFPD, staff agrees with the SIFPD that the likely emergency response requirements of HHSEGS would likely create a significant public impact.

Staff's conversations with both Fire Chief Larry Levy of SIFPD and Fire Chief Scott F. Lewis of Pahrump Valley Rescue Service (PVRS) have confirmed that there is a longstanding practice of providing mutual aid between their respective fire and EMS agencies. However, currently there is not a formal, signed mutual aid agreement between the two agencies. With ongoing growth in demand for response services in the areas caused by, among other things, solar energy plants, this informal practice could well be tested going forward, and cannot be relied upon in this siting case to enable the local fire department to maintain its level of service under increasing demands.

Assurance of the ability of the SIFPD to continue to provide its current level of response requires expansion of SIFPD's resources in equipment, location, and personnel to handle potential draw-down situations in which there would not be enough resources to provide adequate service response to near-simultaneous emergency incidents.

Mitigation of this risk to the public through the payments to, or agreements with, the, SIFPD by the applicant to address services augmentation is feasible, but has not yet been agreed to between the applicant and SIFPD. Staff understands that there are ongoing discussions between the applicant and SIFPD, but that thus far, with regards to potential impacts from construction and operation of HHSEGS, no agreements have been made. Therefore, staff is proposing mitigation to reduce these impacts to less than significant by requiring an initial payment to the SIFPD for capital and personnel support and an agreement with the SIFPD (see proposed Conditions of Certification **WORKER SAFETY-6** and **-7**).

Most of the transmission line and natural gas pipeline linears would be located in Nevada on United States Bureau of Land Management (BLM) land. Therefore, the environmental and permit review of impact from the Nevada portion of the linears would be conducted by BLM.

## INTRODUCTION

---

The proposed action evaluated within this Final Staff Assessment (FSA) is for the construction and operation of the Hidden Hills Solar Electric Generating System (HHSEGS), a proposed solar-thermal electricity generation facility located on private lands, leased in southeastern Inyo County, California. Most of the transmission line and natural gas pipeline linears are located in Nevada on BLM land.

Worker safety and fire protection are regulated through laws, ordinances, regulations, and standards (LORS), at the federal, state, and local levels. Industrial workers at the facility operate equipment and handle hazardous materials daily and may face hazards that can result in accidents and serious injury. Protection measures are employed to eliminate or reduce these hazards or to minimize the risk through special training, protective equipment, and procedural controls.

The purpose of this FSA is to assess the worker safety and fire protection measures proposed by the HHSEGS and to determine whether the applicant has proposed adequate measures to:

- comply with applicable safety LORS;
- protect the workers during construction and operation of the facility;
- protect against fire; and
- provide adequate emergency response procedures.

## LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

**Worker Safety and Fire Protection Table 1  
Laws, Ordinances, Regulations, and Standards (LORS)**

<b><u>Applicable Law</u></b>	<b><u>Description</u></b>
<b>Federal</b>	
Title 29, U.S. Code (U.S.C.) section 651 et seq. (Occupational Safety and Health Act of 1970)	This act mandates safety requirements in the workplace with the purpose of "[assuring] so far as possible every working man and woman in the nation safe and healthful working conditions and to preserve our human resources" (29 U.S.C. § 651).
Title 29, Code of Federal Regulation (C.F.R.), sections 1910.1 to 1910.1500 (Occupational Safety and Health Administration Safety and Health Regulations)	These sections define the procedures for promulgating regulations and conducting inspections to implement and enforce safety and health procedures to protect workers, particularly in the industrial sector.
Title 29, C.F.R., sections 1952.170 to 1952.175	These sections provide federal approval of California's plan for enforcement of its own Safety and Health requirements, in lieu of most of the federal requirements found in Title 29 C.F.R. sections 1910.1 to 1910.1500.
<b>State</b>	
Title 8, California Code of Regulations (Cal Code Regs.) all applicable sections (Cal/OSHA regulations)	These sections require that all employers follow these regulations as they pertain to the work involved. This includes regulations pertaining to safety matters during construction, commissioning, and operations of power plants, as well as safety around electrical components, fire safety, and hazardous materials use, storage, and handling.
Title 24, Cal Code Regs., section 3, et seq.	This section incorporates the current addition of the International Building Code.
Health and Safety Code section 25500, et seq.	This section presents Risk Management Plan requirements for threshold quantity of listed acutely hazardous materials at a facility.
Health and Safety Code sections 25500 to 25541	These sections require a Hazardous Material Business Plan detailing emergency response plans for hazardous materials emergency at a facility.
<b>Local (or locally enforced)</b>	
None	

## METHODOLOGY AND THRESHOLDS FOR DETERMINING ENVIRONMENTAL CONSEQUENCES

Two issues are assessed in Worker Safety and Fire Protection:

1. The potential for impacts on the safety of workers during demolition, construction, and operations activities, and
2. Fire prevention/protection, emergency medical services (EMS) and response, and hazardous materials (hazmat) spill response during demolition, construction, and operations.

Worker safety issues are thoroughly addressed by the California Department of Occupational Safety and Health (Cal/OSHA) regulations. If all LORS are followed, workers will be adequately protected. Thus, the standard for staff's review and determination of significant impacts on workers is whether or not the applicant has

demonstrated adequate knowledge about and dedication to implementing all pertinent and relevant Cal/OSHA standards.

Regarding fire prevention matters, staff review and evaluate the on-site fire-fighting systems proposed by the applicant and the time needed for off-site local fire departments to respond to a fire, medical, or hazardous material emergency at the proposed power plant site. If on-site systems do not follow established codes and industry standards, staff identifies and recommends additional measures. Staff reviews and evaluates the local fire department capabilities and response time in each area and interviews the local fire officials to determine whether they feel adequately trained, staffed, and equipped to respond to the actual and potential needs of the proposed power plant. Staff then determines if the presence of the power plant would cause a significant impact on a local fire department. If it does, staff will identify and recommend that the applicant mitigate this impact by providing increased resources to the fire department.

Staff has also established methodology for use when a local fire department has identified either a significant incremental project impact to a local agency or a significant incremental cumulative impact to a local agency. Staff first conducts an initial review of the fire department's position and either agrees or disagrees with the fire department's determination that a significant impact would exist if the proposed power plant were built and operated. A process then starts whereby the project applicant can either accept the determination made by staff or refute the determination by providing a Fire and Emergency Services Needs Assessment and a Risk Assessment. The Fire and Emergency Services Needs Assessment would address fire response and equipment/staffing/location needs while the Risk Assessment would be used to establish that while an impact to the fire department might indeed exist, the risk (chance) of that impact occurring and causing injury or death may or may not be less than significant.

## **PROPOSED PROJECT**

---

### **SETTING AND EXISTING CONDITIONS**

The Hidden Hills Solar Electric Generating System (HHSEGS) is proposed for development by a wholly owned subsidiary of BrightSource Energy, Inc. (Applicant). As proposed, HHSEGS would be located on approximately 3,096 acres of privately owned land leased in Inyo County, California, adjacent to the Nevada border. The project site is approximately 8 miles south of Pahrump, Nevada, and approximately 45 miles northwest of Las Vegas, Nevada.

As proposed, HHSEGS would comprise two solar fields and associated facilities: the northern solar plant (Solar Plant 1) and the southern solar plant (Solar Plant 2). Each solar plant would generate 270 megawatts (MW) gross (250 MW net), for a total net output of 500 MW. Solar Plant 1 will occupy approximately 1,483 acres (or 2.3 square miles), and Solar Plant 2 will occupy approximately 1,510 acres (or 2.4 square miles). A 103-acre common area would be established on the southeastern corner of the site to accommodate an administration, warehouse, and maintenance complex, an onsite 138

kV switchyard and a natural gas metering station. A temporary construction laydown and parking area on the west side of the proposed project site would temporarily occupy approximately 180 acres.

## **ASSESSMENT OF DIRECT AND INDIRECT IMPACTS AND DISCUSSION OF MITIGATION**

### **Worker Safety**

Industrial environments are potentially dangerous during construction and operation of facilities. Workers at the proposed HHSEGS would be exposed to loud noises, moving equipment, trenches, and confined space entry and egress problems. The workers may experience falls, trips, burns, lacerations, and numerous other injuries. They have the potential to be exposed to falling equipment or structures, chemical spills, hazardous waste, fires, explosions, electrical sparks, and electrocution. It is important for the HHSEGS to have well-defined policies and procedures, training, and hazard recognition and control at its facility to minimize such hazards and protect workers. If the facility complies with all LORS, workers will be adequately protected from health and safety hazards.

Safety and Health Programs would be prepared by the applicant to minimize worker hazards during construction and operation. Staff uses the phrase “Safety and Health Program” to refer to the measures that would be taken to ensure compliance with the applicable LORS during the construction and operational phases of the project.

### **Construction Safety and Health Program**

Workers at the HHSEGS would be exposed to hazards typical of construction and operation of a solar thermal electric power generating facility.

Construction Safety Orders are contained in Title 8 California Code of Regulations sections 1502, et seq. These requirements are promulgated by Cal/OSHA and would be applicable to the construction phase of the project. The Construction Safety and Health Program would include the following:

- Construction Injury and Illness Prevention Program (Cal Code Regs., tit. 8, § 1509)
- Construction Fire Prevention Plan (Cal Code Regs., tit. 8, § 1920)
- Personal Protective Equipment Program (Cal Code Regs., tit. 8, §§ 1514 — 1522)
- Emergency Action Program and Plan

Additional programs under General Industry Safety Orders (Cal Code Regs., tit. 8, §§ 3200 to 6184), Electrical Safety Orders (Cal Code Regs., tit. 8, §§ 2299 to 2974) and Unfired Pressure Vessel Safety Orders (Cal Code Regs., tit. 8, §§ 450 to 544) would include:

- Electrical Safety Program
- Motor Vehicle and Heavy Equipment Safety Program
- Forklift Operation Program

- Excavation/Trenching Program
- Fall Protection Program
- Scaffolding/Ladder Safety Program
- Articulating Boom Platforms Program
- Crane and Material Handling Program
- Housekeeping and Material Handling and Storage Program
- Respiratory Protection Program
- Employee Exposure Monitoring Program
- Hand and Portable Power Tool Safety Program
- Hearing Conservation Program
- Back Injury Prevention Program
- Ergonomics Program
- Heat and Cold Stress Monitoring and Control Program
- Hazard Communication Program
- Lock Out/Tag Out Safety Program
- Pressure Vessel and Pipeline Safety Program
- Solar Components Safe Handling Program

The Application for Certification (AFC) includes adequate outlines of the above programs (HHSG 2011a, § 5.16.4). Prior to the start of construction of HHSEGS, detailed programs and plans would be provided to the California Energy Commission compliance project manager (CPM) and to the SIFPD pursuant to the Condition of Certification **WORKER SAFETY-1**.

## **Operations and Maintenance Safety and Health Program**

Prior to the start of operations at HHSEGS, the Operations and Maintenance Safety and Health Program would be prepared. This operational safety program would include the following programs and plans:

- Injury and Illness Prevention Program (Cal Code Regs., tit. 8, § 3203)
- Fire Protection and Prevention Program (Cal Code Regs., tit. 8, § 3221)
- Personal Protective Equipment Program (Cal Code Regs., tit. 8, §§ 3401 to 3411)
- Emergency Action Plan (Cal Code Regs., tit. 8, § 3220)

In addition, the requirements under General Industry Safety Orders (Cal Code Regs., tit. 8, §§ 3200 to 6184), Electrical Safety Orders (Cal Code Regs., tit. 8, §§ 2299 to 2974) and Unfired Pressure Vessel Safety Orders (Cal Code Regs., tit. 8, §§ 450 to 544) would be applicable to the project. Written safety programs for HHSEGS, which the

applicant would develop, would ensure compliance with the above-mentioned requirements.

The AFC includes adequate outlines of the Injury and Illness Prevention Program, Emergency Action Plan, Fire Prevention Program, and Personal Protective Equipment Program (HHS 2011a, § 5.16.4.4). Prior to operation of HHSEGS, all detailed programs and plans would be provided to the CPM and SIFPD pursuant to Condition of Certification **WORKER SAFETY-2**.

## **Safety and Health Program Elements**

As mentioned above, the applicant provided the proposed outlines for both a Construction Safety and Health Program and an Operations Safety and Health Program. The measures in these plans are derived from applicable sections of state and federal law. Both safety and health programs would comprise six more specific programs and would require major items detailed in the following paragraphs.

### **Injury and Illness Prevention Program**

The IIPP would include the following components as presented in the AFC (HHS 2011a, § 5.16.4):

- identity of person(s) with authority and responsibility for implementing the program; and
- safety and health policy of the plan.

### **Definition of work rules and safe work practices for construction activities**

- system for ensuring that employees comply with safe and healthy work practices;
- system for facilitating employer-employee communications;
- procedures for identifying and evaluating workplace hazards and developing necessary program(s);
- methods for correcting unhealthy/unsafe conditions in a timely manner;
- safety procedures; and
- training and instruction.

### **Fire Prevention Plan**

California Code of Regulations requires an Operations Fire Prevention Plan (Cal Code Regs., tit. 8, § 3221). The AFC outlines a proposed Fire Prevention Plan which is acceptable to staff with respect to CEQA (HHS 2011a, § 5.16.2.3). The plan would accomplish the following:

- determine general program requirements (scope, purpose, and applicability);
- determine potential fire hazards;
- develop good housekeeping practices and proper handling and materials storage;
- determine potential ignition sources and control measures for these sources;

- determine persons responsible for equipment and system maintenance;
- locate portable and fixed fire-fighting equipment in suitable areas;
- establish and determine training and instruction requirements; and
- define recordkeeping requirements.

Staff proposes that the applicant submit a final Fire Prevention Plan to the SIFPD for review and comment and to the CPM for review and approval to satisfy proposed Conditions of Certification **WORKER SAFETY-1** and **-2**.

### **Personal Protective Equipment Program**

California regulations require Personal Protective Equipment (PPE) and first aid supplies whenever hazards are present that, due to process, environment, chemicals or mechanical irritants, can cause injury or impair bodily function as a result of absorption, inhalation, or physical contact (Cal Code Regs., tit. 8, §§ 3380 to 3400). The HHSEGS operational environment would require PPE.

All safety equipment must meet National Institute of Safety and Health (NIOSH) or American National Standards Institute (ANSI) standards and would carry markings, numbers, or certificates of approval. Respirators must meet NIOSH and Cal/OSHA standards. Each employee must be provided with the following information pertaining to the protective clothing and equipment:

- proper use, maintenance, and storage;
- when to use the protective clothing and equipment;
- benefits and limitations; and
- when and how to replace the protective clothing and equipment.

The PPE Program ensures that employers comply with the applicable requirements for PPE and provides employees with the information and training necessary to protect them from potential workplace hazards.

### **Emergency Action Plan**

California regulations require an Emergency Action Plan (Cal Code Regs., tit. 8, § 3220). The AFC contains a satisfactory outline for an emergency action plan (HHSG 2011a, § 5.16.4). The emergency action plan would accomplish the following:

- establish scope, purpose, and applicability;
- identify roles and responsibilities;
- determine emergency incident response training;
- develop emergency response protocols;
- specify evacuation protocols;
- define post emergency response protocols; and
- determine notification and incident reporting.



## Written Safety Program

In addition to the specific plans listed above, additional LORS called *safe work practices* apply to the project. Both the Construction and the Operations Safety Programs would address safe work practices under a variety of programs. The components of these programs include, but are not limited to, the programs found under the heading “Construction Safety and Health Program” in this Worker Safety and Fire Protection section.

## Safety Training Programs

Employees would be trained in the safe work practices described in the above-referenced safety programs.

## Additional Safety Issues

### WORKER EXPOSURE TO HERBICIDES

The applicant has indicated that workers will be adequately trained and protected, but has not included precautions against exposure to herbicides. Therefore, to ensure that workers are indeed protected, staff has identified and proposed additional requirements to Conditions of Certification **WORKER SAFETY-1** and **-2**. These requirements consist of the following provision:

- The development and implementation of Best Management Practices (BMP) for the storage and application of herbicides used to control weeds beneath and around the solar heliostats.

A BMP requiring proper herbicide storage and application will mitigate potential risks to workers from exposure to herbicides and reduce the chance that herbicides will contaminate either surface water or groundwater. Staff recommends that a BMP follow either the guidelines established by the U.S. EPA (EPA 1993), or more recent guidelines established by the State of California or U.S. EPA.

### EYESIGHT PROTECTION FROM PHOTOCHEMICAL RETINAL DAMAGE

Photochemical retinal damage is associated with long-duration exposure times as well as lower-wavelength (higher-energy) light exposure. While retina pigment epithelium (RPE) and the neurosensory retina are protected from light-induced exposure by the absorption profile of the surrounding ocular structures (e.g., cornea, crystalline lens, macular pigments) and through retinal photoreceptor outer segment regeneration, photic injury is still possible due to photochemical retinal light toxicity mechanisms.

Photochemical injury is both dose-dependent and cumulative in nature. The cumulative time-dependent nature is that daily exposures can build up and can last many weeks. For example, it has been estimated that the half-life (when an exposure effect has decayed to approximately 37 percent) of the cumulative dose exposure effect is on the order of 30 days. This has significant implications for workers over many weeks that spend a significant amount of time in proximity to the high luminance environment of a solar field in the presence of the additional high natural ambient brightness of the desert environment.

When evaluating the implications of these effects on the viewer of the tower or the heliostats, it must be noted that the effect is directly related to the ambient and background light conditions. The Hidden Hills SEGF is located in a bright desert environment thereby increasing the potential chance for photochemical retinal damage. The cumulative daily exposure to workers to the ambient environment combined with the additional potential cumulative effects of heliostat and solar receiver steam generator (SRSG) exposure puts project workers at risk for photochemical retinal damage. This is due to the cumulative effect discussed above.

Thus, to ensure the safety of the workers and others within the project boundaries, personnel protection equipment (PPE), in the form of protective glasses will be provided. Protective glasses have been developed for workers engaged in intense solar field work, tower work, and intense close viewing of the SRSG.

The potential photochemical retinal hazards are calculated according to IEC 62471 standard (same as CIE S 009: 2002), titled: "Photobiological Safety of Lamps and Lamp Systems", where the spectral values were taken from "ASTM G173-03 Reference Spectra Derived from SMARTS v. 2.9.2 (AM1.5)" and are the same as the "ISO 9845-1-1992."

Therefore, staff recommends that the applicant include in their personal protective equipment (PPE) plans that will be elements of the Project Construction Safety and Health Program required by proposed Condition of Certification **Worker Safety-1** and the Project Operations and Maintenance Safety and Health Program required by proposed Condition of Certification **Worker Safety-2**, an Eyesight Protection from Retinal Damage Plan that is designed to insure that workers in the solar field receive and wear the appropriate protective sunglasses. This Eyesight Protection from Retinal Damage Plan would:

- (1) identify and acquire the appropriate eye protection (EP) equipment based on the IEC 62471 standards in sufficient numbers to provide safety glasses for the workers engaged in solar field work, and tower work where the potential exists for heliostat solar reflective exposure or SRSG exposure during operations,
- (2) establish the requirements and procedures for the donning and doffing of the EP by workers and provide training and,
- (3) monitor worker use of the PPE and compliance with the EP procedures.

Refer to the **Traffic and Transportation** section or **Appendix TT1- Glint and Glare Safety Impact Assessment** of this PSA for a more complete and detailed discussion of this topic.

## **VALLEY FEVER (COCCIDIOIDOMYCOSIS)**

Coccidioidomycosis or "Valley Fever" (VF) is primarily encountered in southwestern states, particularly in Arizona and California. It is caused by inhaling the spores of the fungus *Coccidioides immitis*, which are released from the soil during soil disturbance (e.g., during construction activities) or wind erosion. The disease usually affects the lungs and can have potentially severe consequences, especially in at-risk individuals such as the elderly, pregnant women, and people with compromised immune systems. Trenching, excavation, and construction workers are often the most exposed population. Treatment usually includes rest and antifungal medications. No effective vaccine currently exists for Valley Fever. VF is endemic to the San Joaquin Valley in California, which presumably gave this disease its common name. In California, the highest VF rates are recorded in Kern, Kings, and Tulare Counties, followed by Fresno and San Luis Obispo Counties. LA County, San Diego County, San Bernardino County, and Riverside County also have reported VF cases although much fewer.

Between 2001 and 2010, there was only one reported case of VF in Inyo County (in 2006). Staff believes that no special measures beyond the standard measures required by Cal-OHSA for respiratory protection are needed and thus proposes no condition of certification on this topic.

## **Additional Mitigation Measures**

Protecting construction workers from injury and disease is among the greatest challenges in occupational safety and health. The following facts are reported by the National Institute for Occupational Safety and Health (NIOSH):

- More than 7 million persons work in the construction industry, representing 6 percent of the labor force. Approximately 1.5 million of these workers are self-employed.
- Of approximately 600,000 construction companies, 90 percent employ fewer than 20 workers. Few have formal safety and health programs.
- From 1980 to 1993, an average of 1,079 construction workers were killed on the job each year—more fatal injuries than in any other industry.
- Falls caused 3,859 construction worker fatalities (25.6 percent) between 1980 and 1993.
- Construction injuries account for 15 percent of workers' compensation costs.
- Assuring safety and health in construction is complex, involving short-term work sites, changing hazards, and multiple operations and crews working in close proximity.
- In 1990, Congress directed NIOSH to undertake research and training to reduce diseases and injuries among construction workers in the United States. Under this mandate, NIOSH funds both intramural and extramural research projects.

The hazards associated with the construction industry are thus well documented. These hazards increase in complexity in the multi-employer worksites typical of large, complex, industrial-type projects such as the construction of solar power plants. In order to reduce and/or eliminate these hazards, it has become standard industry practice to hire

a Construction Safety Supervisor to ensure a safe and healthful environment for all personnel. That this standard practice has reduced and/or eliminated hazards has been evident in the audits staff recently conducted of power plants under construction. The federal Occupational Safety and Health Administration (OSHA) has also entered into strategic alliances with several professional and trade organizations to promote and recognize safety professionals trained as Construction Safety Supervisors, Construction Health and Safety Officers, and other professional designations. The goal of these partnerships is to encourage construction subcontractors in four areas:

- to improve their safety and health performance;
- to assist them in striving for the elimination of the four hazards (falls, electrical, caught in/between and struck-by hazards), which account for the majority of fatalities and injuries in this industry and have been the focus of targeted OSHA inspections;
- to prevent serious accidents in the construction industry through implementation of enhanced safety and health programs and increased employee training; and
- to recognize those subcontractors with exemplary safety and health programs.

To date, there are no OSHA or Cal/OSHA requirements that an employer hire or provide for a Construction Safety Officer. OSHA and Cal/OSHA regulations do, however, require that safety be provided by an employer and the term *Competent Person* is used in many OSHA and Cal/OSHA standards, documents, and directives. A Competent Person is usually defined by OSHA as an individual who, by way of training and/or experience, is knowledgeable of standards, is capable of identifying workplace hazards relating to the specific operations, is designated by the employer, and has authority to take appropriate action. Therefore, in order to meet the intent of the OSHA standard to provide for a safe workplace during power plant construction, staff proposes Condition of Certification **WORKER SAFETY-3**, which would require the applicant/project owner to designate and provide for a power plant site Construction Safety Supervisor.

As discussed above, the hazards associated with the construction industry are well documented. These hazards increase in complexity in the multi-employer worksites typical of large, complex, industrial-type projects such as the construction of solar power plants.

Accidents, fires, and a worker death have occurred at Energy Commission-certified power plants in the past decade due to the failure to recognize and control safety hazards and the inability to adequately supervise compliance with occupational safety and health regulations. Safety problems have been documented by Energy Commission staff in safety audits conducted in 2005 at several power plants under construction. The findings of the staff audits include, but are not limited to, such safety oversights as:

- lack of posted confined space warning placards/signs;
- confusing and/or inadequate electrical and machinery lockout/tagout permitting and procedures;

- confusing and/or inappropriate procedures for handing over lockout/tagout and confined space permits from the construction team to commissioning team and then to operations;
- dangerous placement of hydraulic elevated platforms under each other;
- inappropriate placement of fire extinguishers near hotwork;
- dangerous placement of numerous power cords in standing water on the site, thus increasing the risk of electrocution;
- construction of an unsafe aqueous ammonia unloading pad;
- inappropriate and unsecure placement of above-ground natural gas pipelines inside the facility but too close to the perimeter fence; and
- lack of adequate employee- or contractor-written training programs addressing proper procedures to follow in the event of finding suspicious packages or objects either on or off site.

In order to reduce and/or eliminate these hazards, it is necessary for the Energy Commission to have a professional Safety Monitor on site to track compliance with Cal/OSHA regulations and periodically audit safety compliance during construction, commissioning, and the hand-over to operational status. These requirements are outlined in Condition of Certification **WORKER SAFETY-4**. A Safety Monitor, hired by the project owner, yet reporting to the Chief Building Official (CBO) and CPM, will serve as an “extra set of eyes” to ensure that safety procedures and practices are fully implemented at all power plants certified by the Energy Commission.

## **Fire Hazards**

During construction and operation of the proposed HHSEGS project, there is the potential for both small fires and major structural fires. Electrical sparks, combustion of fuel oil, hydraulic fluid, mineral oil, insulating fluid at the power plant switchyard or flammable liquids, explosions, and over-heated equipment, may cause small fires. Major structural fires in areas without automatic fire detection and suppression systems are unlikely to develop at power plants. Compliance with all LORS and the proposed COCs would be adequate to assure protection from all fire hazards.

Staff reviewed the information provided in the AFC and reviewed correspondence from a representative of the SIFPD to determine if available fire protection services and equipment would adequately protect workers and to determine the project’s impact on fire protection services in the area. Staff also reviewed the May 9, 2012 Fire Risk Assessment submitted by the applicant (CH2 2012z). The project would rely on both on-site fire protection systems and local fire protection services. The on-site fire protection system provides the first line of defense for small fires. In the event of a major fire, fire support services, including trained firefighters and equipment for a sustained response, would be provided by the SIFPD (CEC 2012h, SIFPD2012a, HHSG 2011a, §§ 5.10.3.6.2 and 5.16.4.7).

## Construction

During construction, the permanent fire protection systems proposed for the HHSEGS would be installed as soon as practical; until then portable fire extinguishers would be placed throughout the site at appropriate intervals and periodically maintained. Safety procedures and training would be implemented according to the guidelines of the Construction Fire Protection and Prevention Plan.

The applicant has also indicated that it intends to construct and operate an above-ground fuel depot for motor vehicles on the site. The fuel depot will contain a maximum of 34,000 gallons of diesel fuel (HHSF 2011a, Table 5.5-3R1).

The fire protection measures that are required by code for the fuel depot and dispensing facility include:

- Chapter 22 of the 2010 California Fire Code: Motor Fuel-Dispensing Facilities and Repair Garages
- NFPA 30a: Code for Motor Fuel Dispensing Facilities and Repair Garages (2012 Edition)

Applicable sections of the 2010 California Fire Code (CFC) and NFPA 30a are very similar; however NFPA 30a contains more details for fuel tank design specifications and other requirements. The requirements listed in these codes include the materials to be used to construct fuel tanks, location of dispensing devices, spacing from other structures, fencing, physical protective barriers, shut-off valves, emergency relief venting, secondary containment, vapor and liquid detection systems with alarms, and other general design requirements.

NFPA 30a requires the following:

### 7.3.5 Fixed Fire Protection.

7.3.5.1 For an unattended, self-serve, motor fuel dispensing facility, additional fire protection shall be provided where required by the *authority having jurisdiction. (italics added)*

7.3.5.2 Where required, an automatic fire suppression system shall be installed in accordance with the appropriate NFPA standard, manufacturers' instructions, and the listing requirements of the systems.

### 9.2.5 Basic Fire Control.

9.2.5.1 Sources of Ignition. Smoking materials, including matches and lighters, shall not be used within 6m (20 ft) of areas used for fueling, servicing fuel systems.

9.2.5.2 Fire Extinguishers. Each motor fuel dispensing facility or repair garage shall be provided with fire extinguishers installed, inspected, and maintained as required by NFPA 10, *Standard for Portable Fire Extinguishers*. Extinguishers for outside motor fuel dispensing areas shall be provided

according to the extra (high) hazard requirements for Class B hazards, except that the maximum travel distance to an 80 B:C extinguisher shall be permitted to be 30.48m (100 feet).

9.2.5.3 Fire Suppression Systems. Where required, automatic fire suppression systems shall be installed in accordance with appropriate NFPA standard, manufacturer's instructions, and the listing requirements of the systems.

The authority having jurisdiction is the Energy Commission and the SIFPD, which would review and comment on the fire detection and suppression plans for the fuel depot before it is built and operated.

The only fire protection measure explicitly listed in the California Fire Code is a requirement for fire extinguishers to be located within 75 feet of the fuel dispensing equipment. Neither the CFC nor the Inyo County code requires sprinkler systems for fuel dispensing facilities. Section 2203.2 of the CFC requires an approved, clearly identified and readily accessible emergency disconnect switch at an approved location to stop the transfer of fuel to the fuel dispensers in the event of a fuel spill or other emergency. Section 2205.3 requires spill control to prevent liquids spilled during dispensing operations from flowing into buildings and section 2206.5 requires that above-ground tanks be provided with secondary containment in the form of drainage control or placement of berms or dikes. The applicant has proposed to install secondary containment.

Staff assessed the proposed fuel depot and determined that the applicant intends to meet all codes and standards in their operations of the fuel depot. Proposed Condition of Certification **WORKER SAFETY-1** would require that the SIFPD review and the CPM review and approve the fire protection systems for the fuel depot.

Regarding the need for emergency response during construction and the impacts on the SIFPD, please see the discussion below.

## Operation

The information in the AFC indicates that the project intends to meet the fire protection and suppression requirements of the 2010 California Fire Code, all applicable recommended NFPA standards (including Standard 850 addressing fire protection at electric generating plants), and all Cal/OSHA requirements, including providing a secondary access point for emergency response vehicles. The California Fire Code (24 CCR Part 9, chapter 5, section 503.1.2) requires that access to the site be reviewed and approved by the fire department. All power plants licensed by the Energy Commission have more than one access point to the power plant site. This is sound fire safety procedure and allows for fire department vehicles and personnel to access the site should the main gate be blocked.

Fire suppression elements in the proposed plant would include both fixed and portable fire extinguishing systems. The fire water would be stored in a 250,000 gallon water storage tank with a dedicated fire protection supply of 100,000 gallons, one tank in each

power block. The source of the water will be on-site wells (HHSg 2011a, Appendix 2F.3.1.4) Two sets of fire pumps, each consisting of one electric and one diesel-fueled backup firewater pump would ensure water supply to two fire protection water loops and an electric jockey pump would maintain pressure in the system (HHSg 2011a, § 2.2.9).

Fire hydrants would be installed throughout the site per California Fire Code requirements. Fixed fire suppression systems would be installed at determined fire risk areas such as the generator step-up transformers and turbine lube oil equipment. A sprinkler system would be installed at the steam turbine generator and in administrative buildings. In addition to the fixed fire protection system, appropriate class of service portable extinguishers and fire hydrants/hose stations would be located throughout the facility at code-approved intervals.

The fire protection system must have fire detection sensors and monitoring equipment that would trigger alarms and automatically actuate the suppression systems. Staff has determined that these systems will ensure adequate fire protection.

The applicant would be required by Conditions of Certification **WORKER SAFETY-1** and **-2** to provide the final construction and operations Fire Protection and Prevention Programs to staff and to the SIFPD prior to construction and operation of the project to confirm the adequacy of the proposed fire protection measures.

### **SIFPD Impacts**

The project site is within the jurisdiction of the Southern Inyo Fire Protection District (SIFPD). SIFPD has one station in Tecopa and one temporary location in Charleston View. The Tecopa fire station would be the first responder for medical emergencies at the project site (CH2 2011e, p. 14). A response from the Tecopa Station, 27 miles from the project site, would take about 30 to 40 minutes (HHSg 2011a, § 5.5.4.3 and CEC 2012h). As of February 2012, SIFPD staff at the Tecopa station consisted of two personnel with Emergency Medical Technician-Basic (EMT-B) certification, one Firefighter II (FFII), two Firefighter I (FFI) in training, and four Entry Level Firefighter/First Responders. With the exception of the Fire Chief and the Administrative Officer, which are paid, SIFPD personnel are volunteers that respond on a 24-hour, 7-day per week basis. The SIFPD equipment consists of two Light Rescue Units, two Type 2 Engines, one Basic Life Support Ambulance and one Ambulance. (CH2 2012z, pg. 7-1) All firefighters in SIFPD have first response medical training called Basic Life Support (BLS) training. The Tecopa station has one ambulance staffed with three personnel and a fire truck staffed by two personnel, which would likely respond to emergencies at the project site. (CH2 2011e, p. 14, and CEC 2012h).

Staff's conversations with both Fire Chief Larry Levy of SIFPD and Fire Chief Scott F. Lewis of Pahrump Valley Rescue Service (PVRS) have confirmed that there is a longstanding practice of providing mutual aid between their respective fire and EMS agencies. However, currently there is not a formal, signed mutual aid agreement between the two agencies. With ongoing growth in demand for response services in the areas caused by, among other things, solar energy plants, this informal practice could



well be tested going forward, and cannot be relied upon in this siting case to enable the local fire services to maintain its level of service under its increasing demands.

In an email from Larry Levy, Acting Chief of the SIFPD (CEC 2012h), and in a letter from William D. Ross, who provides legal representation for the SIFPD (SIFPD2012a), it is stated that the HHSEGS project would have an impact on SIFPD's ability to maintain its level of service for fire, hazmat, and EMS emergencies to its service district. Note that this conclusion was reached before the recent project changes that effectively would double the construction workforce and associated traffic, and would likely increase the proposed project's impacts on EMS response.

Staff has considered the position of the SIFPD and all relevant information as well as past experience at existing solar power plants that are similar to, but smaller than, the proposed project. Staff reviewed the records of emergency responses of the San Bernardino County Fire Department (SBCFD) to the only three operating thermal solar power plants in the state. These are the Solar Electric Generating Station (SEGS) 1 & 2 in Daggett (operating since 1984), SEGS 3-7 at Kramer Junction (1989), and SEGS 8 & 9 at Harper Dry Lake (1989). Staff also reviewed what records were immediately available at the three solar plants. All sources stated that their records were incomplete and not comprehensive. Staff wishes to caution that since the number of thermal solar power plants is so few and their operating history so short, any conclusion as to accident incident rates is meaningless from a statistical perspective. Simply put, the data set is not robust enough to draw any conclusions about their safety records. Nevertheless, this information is provided for illustrative purposes.

Three types of fire department responses to the solar power plants were surveyed:

1. Plan reviews,
2. Hazmat and fire inspections, and
3. Emergency Response including medical, fire, rescue, and hazardous materials incidents.

Regarding visits to the sites for plan review during the years the plants were operating, the SBCFD made four visits to the Kramer Junction facility and one visit to the Harper Lake facility.

Regarding site visits for inspections, reviews, enforcement activities, and follow ups, the SBCFD made 10 inspections to Daggett since 2008, totaling 24 hours of time, 48 visits to Kramer Junction since 2003, totaling 128 hours of time, and 29 visits to Harper Lake since 2004, totaling 105 hours of time.

Regarding emergency response (including fire, rescue, medical and hazardous materials incidents), approximately 30 incidents occurred since 1998 that required the SBCFD (and other fire stations through mutual aid agreements) to respond to the three solar power plant sites. These include fires, fire alarm activations, injuries, medical emergencies, hazardous materials spills, complaints/calls from the public, and false alarms. However, the available records were incomplete as they did not include

documentation of a major fire that occurred at the SEGS 8 facility in January of 1990 that required a large part of the regional resources from four different fire districts including the San Bernardino County, Edwards Air Force Base, California Department of Forestry and Fire Protection (CDF), and the Kern County Fire Departments. This fire is the largest incident that has occurred at a solar thermal plant in California and demonstrates the magnitude of fire department resources that can be required to respond to a fire at a large thermal solar facility.

According to the Daggett solar plant records, only three incidents in the life of the plant required emergency services:

1. Feb 25, 1999: A heat transfer fluid (HTF) fire occurred in the HTF tanks. This was a major fire and the fire department allowed the fire to burn itself out over two days. There were no injuries, but extensive damage occurred.
2. Feb 28, 2000: An employee had a suspected heart attack (which was actually caused by drinking a whole bottle of hot sauce), and an ambulance responded from the fire department.
3. May 15-17, 2010: An HTF spill of about 60 gallons occurred in the solar field. The facility personnel cleaned it up on May 15 and reported it to San Bernardino County on the next business day, May 17. When receiving the report the dispatcher misunderstood the report and sent out a 911 call indicating a spill is in progress. The whole fire department showed up on scene.

According to information received from the Kramer Junction plant, the following incidents required fire department response:

1. August 2002 for an unknown hazmat incident.
2. In 2007 when 30,000 gallons of HTF spilled.
3. In Feb. 2009 when a flex hose failure and an HTF vapor cloud ignited. According to Kramer Junction plant officials, the fire department was not needed as plant staff had the situation under control. A concerned citizen had made a 911 call.

According to information received from the Harper Lake plant, only the January 1990 incident required fire department response. Another comparative example is the Ivanpah Solar Electric Generating Station (Ivanpah), a central receiving station power tower-type project, where construction has resulted in five calls over 19 months to San Bernardino County since construction commenced in October 2010, and its construction activities and workforce are similar to that of the HHSEGS. (CH2 2012z, pg. 8-2)

To summarize, relying on sparse data received from the SBCFD for only the past 10 years and not including the 1990 SEGS 8 fire, the department responded to about 30 incidents and emergencies at the nine solar units (at three locations), including two fires and two hazardous materials spills. During the same period the SBCFD conducted approximately 90 inspections and visits for enforcement actions/plan reviews, totaling about 260 hours of personnel time. The incident rate, therefore, for all three power

plants would be 30 in 12 years or 2.5 emergency calls per year or 0.83 emergencies per solar plant per year.

Additionally, it is very important to note that the HHSEGS power plant (along with the other solar power plants) will be located in an extremely harsh desert environment. The ability of a fire fighter to perform duties while wearing a turn-out coat, heavy boots, and a respirator (self contained breathing apparatus) is limited under the best of circumstances. If conducting a rescue or fighting a fire that necessitates use of a respirator, the high-temperatures of the desert, which often exceed 115 degrees Fahrenheit (°F), severely limit a fire fighter's ability to perform the duties to 15 minutes at a time. This severe time restriction necessitates the mobilization of more fire fighters to respond to the emergency.

Furthermore, emergency response would be needed during construction when construction worker crew sizes are large, reaching 2,293 workers per day (1,682 day shift and 611 swing shift) during Month 19 of construction. The fact that a fuel depot will be on-site also speaks to the need for emergency response capability. As was indicated above, SIFPD operates one year-round fire station in Tecopa, California that is 27 miles southwest of HHSEGS and has an approximate 30- to 40-minute response time. SIFPD indicated in communications in March and July of 2011 that local firefighters are equipped to handle simple HazMat incidents, but that PVFRS and Nye County Emergency Services would need to be called in for assistance with more complex situations, although they do not currently have formal mutual aid agreements with SIFPD.

Staff has considered the position of the SIFPD and all relevant information as well as past experience at existing solar power plants. The fire, hazmat, and EMS needs at the proposed plant are real and would pose significant added demands on SIFPD's local fire protection and emergency medical services.

### **Proposed Mitigation**

Certain tax exemptions for solar power plants reduce the tax revenues going to counties and local agencies that would normally be used to provide the resulting expansion in fire and emergency medical services needed to cover them. The SIFPD does not obtain significant funding from Inyo County and thus would not benefit from any taxes that would be paid to the county. Thus, the potential exists with such solar power plants to cause impacts on public safety as a result of usage and drawdown of local agency resources that provide needed services, such as fire and EMS response to protect the public during emergencies, especially in rural districts where resources are limited, and largely volunteer. In response to a staff inquiry related to Emergency Services dated September, 2011 (CEC 2012h), SIFPD Acting Fire Chief, Larry Levy, suggested that, "the most effective and immediate way for the project to bare its proportional share would be by way of a special tax." Acting Chief Levy went on to list a number of special tax mechanisms, including a Mello-Roos tax and a Fire Suppression Service Assessment.

Staff evaluated the potential and likely demands on the SIFPD with the proposed mitigations provided by the applicant. Staff concludes that there would be an intrinsically

lower fire risk at HHSEGS resulting from its use of water and steam, rather than a flammable organic heat transfer fluid (HTF) as is used in the existing operational solar-thermal power plants at Harper Lake, Kramer Junction, and Daggett. Additionally, the design of the HHSEGS solar field, consisting of solar heliostats (mirrors) and having no piping arrays carrying HTF will greatly reduce the potential for fire, EMS, and Hazmat service calls to SIFPD. Without HTF storage tanks and solar field piping arrays, staff has determined that the potential for a large conflagration does not exist at HHSEGS.

Staff understands that there are ongoing discussions between the applicant and SIFPD, but that thus far, with regards to potential impacts from construction and operation of HHSEGS, no actions have been taken and no agreements have been made. Therefore, staff is proposing mitigation to reduce these impacts to less than significant by requiring an initial payment to the SIFPD for capital and personnel support and an agreement with the SIFPD (see proposed Conditions of Certification **WORKER SAFETY-6 and -7**).

### **Emergency Medical Services Response**

Staff conducted a statewide survey to determine the frequency of Emergency Medical Services (EMS) response to operating natural gas-fired power plants in California. The purpose of the analysis was to determine what impact, if any, power plants might have on local emergency services. Staff concluded that incidents at gas-fired power plants that require EMS response are infrequent and represent an insignificant impact on the local fire departments, except for instances where response times are high or a rural fire department has mostly volunteer fire-fighting staff. In such cases there is potential for draw-down situations to occur where there are insufficient resources to respond to all calls for emergency response.

### ***Emergency Medical Services***

At staff's request, the applicant provided a draft Fire and Emergency Services Risk and Needs Analysis (FESNA) on May 9, 2012 (CH2 2012z). The analysis suggests that by complying with LORS, the project would not create significant impacts on the local SIFPD or local emergency response resources, because any responses needed for fire, medical, or technical rescue needs would be sourced from either the Pahrump Valley Fire-Rescue Services (PVFRS) or Nye County Emergency Services (NCES) in Pahrump, Nevada. The mechanism of how these services would be sourced and paid for from another jurisdiction in the state of Nevada rather than from the local Authority Having Jurisdiction (AHJ), in this case SIFPD, has not been clearly established. Correspondence from Larry Levy, Acting Chief of the SIFPD (CEC 2012h), and William D. Ross, who provides legal representation for the SIFPD (SIFPD 2012a), states that the HHSEGS project would have an impact on SIFPD's ability to maintain its level of service for fire, hazmat, and EMS emergencies to its service district.

PVFRS has a long-standing practice of providing SIFPD mutual aid and response, but does not currently have a signed agreement. PVFRS has four stations, all located in Nevada and staffed with full-time and volunteer firefighters. All PVFRS staff has basic medical training. PVFRS has five ambulances and two medical squads distributed among their four stations. PVFRS' main station has two EMTs and one paramedic, as well as two advanced life support- (ALS) certified ambulances and one ALS-equipped medical squad vehicle (CEC 2011j). The estimated response time from Pahrump Valley

Fire Station No. 3 (12 mile distance) is approximately 15-20 minutes, and from Station No.1 (18 mile distance), it is estimated to be approximately 18-25 minutes (CH2 2012z, Table 7-1). PVFRS is the closest responder to the project site with ALS capabilities and is staffed 24 hours a day.

Nye County Emergency Services (NCES) has a HazMat team that operates out of Nye County Fire Department's Station 51 in Pahrump, which is 28 road miles from the project site, and has an approximate response time of 45 minutes. Station 51 is staffed with 15 to 20 volunteers who are trained as HazMat technicians. The team has the following equipment, as of April 2011: one HazMat truck with 25-foot trailer, one biohazard unit, one fire engine, and one ambulance (HHSG 2011a, Sect 5.5.4.3).

In response to staff's Emergency Medical Response Needs Assessment Form, SIFPD Acting Fire Chief, Larry Levy, stated that "it is the desire of SIFPD to enhance their EMS in the Charleston View area to provide response capabilities to the project site in the 5-10 minute range. This will require the acquisition of both facilities and equipment as well as the training of additional responders (CEC 2012h). SIFPD estimates that to achieve their desired response times they would need a three-bay station to house a new ambulance and existing fire apparatus in the project area and a minimum of two trained EMTs and four firefighters in the project area." Staff notes that emergency response times to Charleston View are currently in the range of 30 to 40 minutes from Tecopa. Charleston View is located adjacent to the HHSEGS entrances, where both construction worker commute traffic and materials transport trucks would both enter and exit the project site.

### ***Off-site Vehicle Accidents***

During the HHSEGS construction period, worker commute traffic and materials transport truck traffic could pose an increased risk for off-site, multi-injury road incidents and accidents. An evaluation of the potential for off-site vehicle accidents was completed by the Applicant, who reported accident rates on Tecopa Road obtained from the California Department of Transportation (Caltrans) and the Statewide Integrated Traffic Records System (that compiles incidents reported by the California Highway Patrol). (CH2 2012z, p. 51, Table 6-3 and 6-4). Based on these reported accidents that occurred on Inyo County roadways in the vicinity of the project for the years 2008, 2009 and 2010, it was estimated that 5 additional accidents would occur on surrounding roadways during the 29 month HHSEGS construction period. Hazards due to off-site vehicle accidents on the roadways in the project vicinity would be less than significant. In order to properly accommodate the increased worker commute traffic and materials transport truck traffic on Tecopa Road at HHSEGS' entry and exit locations, appropriate measures have been recommended by staff in the **Traffic and Transportation** section of this **FSA** and Condition of Certification **TRANS-2**.

### ***Technical Rescue Incidents***

Another potential risk associated with HHSEGS construction activities is technical rescue incidents, including high angle rescue, low angle rescue, and confined space rescue, also called "permit space" rescue. No such incidents have been reported as a result of Ivanpah construction activity in San Bernardino County, a similarly tall, central receiving station power tower-type project. In order to ensure that the demand for high

angle rescue, low angle rescue, and confined space “permit space” rescue on the HHSEGS project site would be less than significant, the incorporation of appropriate employer and employee practices and procedures are implemented in **WORKER SAFETY-3**.

The Occupational Safety & Health Administration (OSHA) provisions §1910.146 (k) and Appendix F contains requirements for practices and procedures to protect employees from the hazards associated with confined and elevated spaces, including procedures for hazards analysis, and the determination of an on-site rescue team or off-site emergency team services. The National Fire Protection Association (NFPA) has established the minimum job performance requirements necessary for off-site emergency rescue teams. NFPA 1670 standards establish levels of functional capability for successfully conducting even the most complex rescue operations. This standard was developed to define levels of preparation and operational capability that should be achieved by any authority having jurisdiction (AHJ) that has responsibility for technical rescue operations.

While the frequency of HHSEGS technical “permit space” emergency rescues is not expected to be significant, **WORKER SAFETY-1** (Construction Emergency Action Plan) shall include specifics regarding the analysis of confined and elevated “permit spaces” and the process for determining an on-site rescue team, or an off-site rescue team. An on-site rescue team would be comprised of appropriately trained and designated employees, per §1910.146(k)(2). An off-site emergency rescue teams, per NFPA 1670 standards, would be personnel from either SIFPD (the authority having jurisdiction) or PVFRS (via a mutual aid agreement).

### ***On-site Medical Emergencies***

Additionally, staff has determined that the potential for both work-related and non-work-related heart attacks exists at power plants. In fact, staff’s research on the frequency of EMS response to gas-fired power plants shows that many of the responses for cardiac emergencies involved non-work-related incidences, including those involving visitors. The need for prompt response within a few minutes is well documented in the medical literature. Staff believes that the quickest medical intervention can only be achieved with the use of an on-site automatic external defibrillator (AED); the response from an off-site provider would take longer regardless of the provider location. This fact is also well documented and serves as the basis for many private and public locations (e.g., airports, factories, government buildings) maintaining on-site cardiac defibrillation devices. Therefore, staff concludes that, with the advent of modern cost-effective cardiac defibrillation devices, it is proper in a power plant environment to maintain such a device on site in order to treat cardiac arrhythmias resulting from industrial accidents or other non-work related causes.

Staff proposes Condition of Certification **WORKER SAFETY-5**, which would require that a portable AED be located on site, that all power plant employees on site during operations to be trained in its use, and that a representative number of workers on site during construction and commissioning also be trained in its use. For a more detailed analysis of EMS capabilities, impacts and suggested mitigation measures, please see the **Socioeconomics** section of this **FSA**.

## **Closure and Decommissioning Impacts and Mitigation**

A closure of the proposed HHSEGS (either temporary or permanent) would follow a Facility Closure Plan prepared by the applicant and designed to minimize public health and environmental impacts. Decommissioning procedures would be consistent with all applicable LORS (HHSR 2011a, § 2.5.2). Staff expects that impacts from the closure and decommissioning process would represent a fraction of the impacts associated with the construction or operation of the proposed HHSEGS. Therefore based on staff's analysis for the construction and operation phases of this project and the closure plan requirements in the **General Conditions** section of this FSA, staff concludes that hazardous materials-related impacts from closure and decommissioning of the HHSEGS would be insignificant with respect to CEQA.

## **CUMULATIVE IMPACTS**

---

Fire protection and emergency services demands caused by routine and emergency incidents at the proposed HHSEGS would continue for the expected 30-year life of the project. Staff considers that if the potential for direct impacts due to construction and operation of the proposed HHSEGS is mitigated to a level of insignificance, then the potential for cumulative impacts with other existing or foreseeable nearby facilities would also be sufficiently mitigated because any such impacts would occur independently of other facilities. However, staff cannot confirm that there would be no cumulative impacts until mitigation for direct impacts has been determined.

## **COMPLIANCE WITH LORS**

---

Staff concludes that construction and operation of the HHSEGS project with staff's proposed mitigation in the conditions of certification would be in compliance with all applicable laws, ordinances, regulations, and standards (LORS) regarding long-term and short-term project impacts in the area of worker safety and fire protection.

## **CONCLUSIONS**

---

Energy Commission staff (staff) has reviewed the Hidden Hills Solar Electric Generating System in accordance with the requirements of CEQA. With respect to CEQA, staff concludes that if the applicant for the proposed HHSEGS project provides a Project Construction Safety and Health Program and a Project Operations and Maintenance Safety and Health Program, as required by Conditions of Certification **WORKER SAFETY-1** and **-2** and fulfills the requirements of Conditions of Certification **WORKER SAFETY-3** through **-5** the project would incorporate sufficient measures to ensure adequate levels of industrial safety and comply with applicable laws, ordinances, regulations, and standards.

The proposed conditions of certification provide assurance that the Construction Safety and Health Program and the Operations and Maintenance Safety and Health Program proposed by the applicant would be reviewed by the appropriate agency before implementation. The conditions also require verification that the proposed plans

adequately assure worker safety and on-site fire protection and comply with applicable laws, ordinances, regulations, and standards.

Staff has considered the position of the Southern Inyo Fire Protection District and all relevant information as well as past experience at other solar power plants in California. SIFPD resources (both personnel and equipment), are limited, commensurate with the low population density of the area it serves. The SIFPD has indicated that it will be significantly impacted (CEC 2012h) because of the magnitude of the proposed project and the large (relative to local population) workforce. Due to the minimal resources of the local SIFPD, staff agrees with the SIFPD that the emergency response requirements of HHSEGS would likely create a significant public impact.

At staff's request, the applicant provided Fire and Emergency Services Risk and Needs Analyses (FESNA) on May 9, 2012 (CH2 2012z). The analyses suggest that by complying with LORS, the project will not create significant impacts on the local SIFPD or local emergency response resources because any responses needed for fire, medical, or technical rescue needs would be sourced from Pahrump Valley Fire-Rescue Services (PVFRS) in Pahrump, Nevada. The official mechanism by which these various services (including technical rescue) would be sourced and paid for from another jurisdiction, like PVFRS in the state of Nevada, rather than from the local Authority Having Jurisdiction (AHJ), in this case SIFPD, has not been established.

Staff's conversations with both Fire Chief Levy of SIFPD and Fire Chief Scott F. Lewis of Pahrump Valley Fire-Rescue Service (PVFRS) have confirmed that there is a longstanding practice of providing mutual aid between their respective fire and EMS agencies, however, there is not currently a formal, signed mutual aid agreement between the agencies. With ongoing growth in demand for response services in the areas caused by, among other things, solar energy plants, this casual practice could well be tested going forward, and cannot be relied upon in this siting case. Generally, mutual aid is reserved for and is requested only when the primary responding agency is unable to adequately respond, and is not considered to be a method for providing primary response.

Assurance of the ability of the SIFPD to continue to provide its current level of response to the public requires expansion of SIFPD's resources in equipment, location, and personnel in order to prevent potential draw-down situations in which there would not be enough resources to provide an adequate level of service response to potentially near-simultaneous emergency incidents (including off-site road accidents).

Staff understands that there are ongoing discussions between the applicant and SIFPD, but that thus far, with regards to potential impacts from construction and operation of HHSEGS, no actions have been taken and no agreements have been reached and made public. Therefore, staff is proposing mitigation to reduce these impacts to less than significant by requiring an initial payment to the SIFPD for capital and personnel support and an agreement with the SIFPD (see proposed Conditions of Certification **WORKER SAFETY-6 and -7**).

Most of the transmission line and natural gas pipeline linears would be located in Nevada on United State Bureau of Land Management (BLM) land. Therefore, the



environmental and permit review of impact from the Nevada portion of the linears would be conducted by BLM.

## **PROPOSED CONDITIONS OF CERTIFICATION/MITIGATION MEASURES**

---

The following conditions of certification meet the Energy Commission's responsibility to comply with the California Environmental Quality Act and serve as staff's recommendations for the Energy Commission to consider in its decision to avoid or reduce the severity of worker safety- and fire protection-related impacts to less than significant and for the project to conform to all applicable LORS.

**WORKER SAFETY-1** The project owner shall submit to the Compliance Project Manager (CPM) a copy of the Project Construction Safety and Health Program containing the following:

- a Construction Personal Protective Equipment Program;
- a Construction Exposure Monitoring Program;
- a Construction Injury and Illness Prevention Program;
- a Construction Heat Stress Protection Plan that implements and expands on existing Cal OSHA regulations as found in 8 CCR 3395;
- a Construction Emergency Action Plan; and
- a Construction Fire Prevention Plan that includes the above-ground fuel depot.
- an Eyesight Protection from Retinal Damage Plan that is designed to insure that workers in the solar field receive and wear the appropriate protective sunglasses. This Eyesight Protection from Retinal Damage Plan would:
  - (1) identify and acquire the appropriate eye protection (EP) equipment based on the IEC 62471 standards in sufficient numbers to provide safety glasses for the workers engaged in solar field work, and tower work where the potential exists for heliostat solar reflective exposure or SRSG exposure during operations,
  - (2) establish the requirements and procedures for the donning and doffing of the EP by workers and provide training and,
  - (3) monitor worker use of the PPE and compliance with the EP procedures.

**Verification:** The Construction Emergency Action Plan and the Fire Prevention Plan shall be submitted to the Southern Inyo Fire Protection District for review and comment 60 days prior to construction. The Personal Protective Equipment Program, the Exposure Monitoring Program, the Injury and Illness Prevention Program, and the Heat Stress Protection Plan shall be submitted to the CPM for review and approval of program compliance with all applicable safety orders 30 days prior to construction.

At least 30 days prior to the start of construction, the project owner shall submit to the CPM for review and approval a copy of the Project Construction Safety and Health Program.

**WORKER SAFETY-2** The project owner shall submit to the CPM a copy of the Project Operations and Maintenance Safety and Health Program containing the following:

- an Operation Injury and Illness Prevention Plan;
- an Operation Heat Stress Protection Plan that implements and expands on existing Cal OSHA regulations ( Cal. Code of Regs., tit. 8, § 3395);
- a Best Management Practices (BMP) for the storage and application of herbicides;
- an Emergency Action Plan;
- Hazardous Materials Management Program;
- Fire Prevention Plan that includes the fuel depot should the project owner elect to maintain and operate the fuel depot during operations (8 Cal Code Regs. § 3221); and
- Personal Protective Equipment Program (Cal Code Regs., tit. 8, §§ 3401—3411).
- an Eyesight Protection from Retinal Damage Plan that is designed to insure that workers in the solar field receive and wear the appropriate protective sunglasses. This Eyesight Protection from Retinal Damage Plan would:
  - (1) identify and acquire the appropriate eye protection (EP) equipment based on the IEC 62471 standards in sufficient numbers to provide safety glasses for the workers engaged in solar field work, and tower work where the potential exists for heliostat solar reflective exposure or SRSG exposure during operations,
  - (2) establish the requirements and procedures for the donning and doffing of the EP by workers and provide training and,
  - (3) monitor worker use of the PPE and compliance with the EP procedures.

**Verification:** The Fire Prevention Plan and the Emergency Action Plan shall also be submitted to the Southern Inyo Fire Protection District for review and comment 60 days prior to the start of operations. The Operation Injury and Illness Prevention Plan, Heat Stress Protection Plan, BMP for Herbicides, and Personal Protective Equipment, and Personal Protective Equipment Program shall be submitted to the CPM for review and approval concerning compliance of the programs with all applicable safety orders 30 days prior to the start of operations.

At least 30 days prior to commercial operation, the project owner shall submit to the CPM for approval a copy of the Project Operations and Maintenance Safety and Health Program.

**WORKER SAFETY-3** The project owner shall provide a site Construction Safety Supervisor (CSS) who, by way of training and/or experience, is knowledgeable of power plant construction activities and relevant laws, ordinances, regulations, and standards; is capable of identifying workplace hazards relating to the construction activities; and has authority to take appropriate action to assure compliance and mitigate hazards. The CSS shall:

- have overall authority for coordination and implementation of all occupational safety and health practices, policies, and programs;
- assure that the safety program for the project complies with all Cal/OSHA and federal regulations related to power plant projects;
- assure that all construction and commissioning workers and supervisors receive adequate safety training;
- complete accident and safety-related incident investigations and emergency response reports for injuries and inform the CPM of safety-related incidents; assure that all the plans identified in Conditions of Certification Worker Safety-1 and -2 are implemented; and,
- provide evidence that proper practices and procedures for the protection of employees involved in construction of the solar power tower, solar receiving steam generator, and/or confined and elevated (high angle) “permit spaces” occurs per federal and state standards (including OSHA §1910.146(k) and Cal/OSHA Standards Part 1910) and the equipment manufacturer’s requirements.

**Verification:** The CSS shall submit in the monthly compliance report (MCR) a monthly safety inspection report to include:

- record of all employees trained for that month (all records shall be kept on site for the duration of project construction);
- summary report of safety management actions and safety-related incidents that occurred during the month;
- report of any continuing or unresolved situations and incidents that may pose danger to life or health; and
- report of accidents and injuries that occurred during the month.

At least 60 days prior to the start of site mobilization, the project owner shall submit to the CPM the name and contact information for the Construction Safety Supervisor (CSS). The contact information of any replacement CSS shall be submitted to the CPM within one business day after replacement.

**WORKER SAFETY-4** The project owner shall make payments to the Chief Building Official (CBO) for the services of a Safety Monitor based upon a reasonable fee schedule to be negotiated between the project owner and the CBO. Those services shall be in addition to other work performed by the CBO. The Safety Monitor shall be selected by and report directly to the CBO and will be

responsible for verifying that the Construction Safety Supervisor, as required in Condition of Certification Worker Safety-3, implements all appropriate Cal/OSHA and Energy Commission safety requirements. The Safety Monitor shall conduct on-site safety inspections at intervals necessary to fulfill those responsibilities.

**Verification:** At least 60 days prior to the start of construction, the project owner shall provide proof of its agreement to fund the Safety Monitor services to the CPM for review and approval.

**WORKER SAFETY-5** The project owner shall ensure that a portable automatic external defibrillator (AED) is located on site during construction and operations and shall implement a program to ensure that workers are properly trained in its use and that the equipment is properly maintained and functioning at all times. During construction and commissioning, the following persons shall be trained in its use and shall be on site whenever the workers that they supervise are on site: the Construction Project Manager or delegate, the Construction Safety Supervisor or delegate, and all shift foremen. During operations, all power plant employees shall be trained in its use. The training program shall be submitted to the CPM for review and approval.

**Verification:** At least 30 days prior to the start of site mobilization, the project owner shall submit to the CPM proof that a portable automatic external defibrillator (AED) exists on site and a copy of the training and maintenance program for review and approval.

**WORKER SAFETY-6** The project owner shall either:

- (1) Reach an agreement with the Southern Inyo Fire Protection District (SIFPD) regarding funding of its project-related share of capital and operating costs to improve fire protection/emergency response infrastructure and provide appropriate equipment as mitigation of project-related impacts on fire protection/emergency response services within the jurisdiction; or
- (2) if no agreement can be reached, the project owner shall fund a study conducted by an independent contractor who shall be selected and approved by the CPM and would fulfill all mitigation identified in the independent fire needs assessment and a risk assessment. The study will evaluate the project's proportionate funding responsibility for the above-identified mitigation measures, with particular attention to emergency response and equipment/staffing/location needs.

Should the project owner pursue option (2), above, the study shall be conducted pursuant to the Fire Needs Assessment and Risk Assessment shall evaluate the following:

- (a) The project's proportionate (incremental) contribution to potential cumulative impacts on the SIFPD and the project allocated costs of enhanced fire protection/emergency response services including the

fire response, hazardous materials spill/leak response, rescue, and emergency medical services necessary to mitigate such impacts;

- (b) The extent that the project's contribution to local tax revenue will reduce impacts on local fire protection and emergency response services; and
- (c) Recommend an amount of funding (and corresponding payment plan) that represents the project's proportional payment obligation for the above-identified mitigation measures.

Compliance Protocols shall be as follows:

- (a) The study shall be conducted by an independent consultant selected by the project owner and approved by the CPM. The project owner shall provide the CPM with the names of at least three consultants, whether entities or individuals, from which to make a selection, together with statements of qualifications;
  - (b) The study shall be fully funded by the project owner.
  - (c) The project owner shall provide the protocols for conducting the independent study for review and comment by the SIFPD and review and approval by the CPM prior to the independent consultant's commencement of the study;
  - (d) The consultant shall not communicate directly with the project owner or SIFPD without express prior authorization from the CPM. When such approval is given, the CPM shall be copied on any correspondence between or among the project owner, SIFPD, and the consultant (including emails) and included in any conversations between or among the project owner, SIFPD and consultant; and
  - (e) The CPM shall verify that the study is prepared consistent with the approved protocols, **or**
- (3) If the project owner and SIFPD do not agree to the recommendations of the independent consultant's study, the Energy Commission CPM or designee shall, based on the results of the study and comments from the project owner and SIFPD, make the final determination regarding the funding to be provided to the SIFPD to accomplish the above-identified mitigation.

Site mobilization shall not occur until funding of mitigation occurs pursuant to either of the resolution options set forth above.

**Verification:** At least 30 days before construction, the project owner shall provide to the CPM:

- (1) A copy of the individual agreement with the SIFPD or, if the owner joins a power generation industry association, a copy of the group's bylaws and a copy of the group's

agreement with the SIFPD; and evidence in each January Monthly Compliance Report that the project owner is in full compliance with the terms of such bylaws and/or agreement; or

(2) a copy of the completed study showing the mitigation or the precise amount the project owner shall pay for mitigation; and documentation that the amount has been paid.

Annually thereafter, the owner shall provide TO the CPM verification of funding to the SIFPD, if annual payments were approved or recommended under either of the above-described funding resolution options.

**WORKER SAFETY -7** The project owner shall provide a \$200,000 payment to Southern Inyo Fire Protection District prior to the start of construction. This funding shall off-set any initial funding required by **WORKER SAFETY-6** above until the funds are exhausted. This offset will be based on a full accounting by the Southern Inyo Fire Protection District regarding the use of these funds.

**Verification:** At least 30 days prior to the start of construction the project owner shall provide documentation of the payment described above to the CPM. The CPM shall adjust the payments initially required by **WORKER SAFETY-6** based upon the accounting provided by the Southern Inyo Fire Protection District.

## REFERENCES

---

CEC 2012h – California Energy Commission/S. Kerr (tn: 63659) Report of Conversation w/ Larry Levy, SIFPD re: medical needs. 2/15/2012

CH2 2012p – CH2MHill/J. Carrier (tn: 64558) Supplemental Data Response, Set 2, Boiler Optimization Plan and Design Change. 4/2/2012

CH2 2011e – CH2MHILL/J. Carrier (tn: 62057) Applicant's Attachment DR20-1 Omitted from Data Response Set 1A. 12/05/2011

CH2 2012d – CH2MHill/J. Carrier (tn: 63635) Applicant's Data Response, Set 2A. 02/09/2012

CH2 2012j – CH2MHill/ M. Finn (tn: 64163) Applicant's Data Response Set 1B-5. 3/15/2012

CH2 2012z – CH2MHill/J. Carrier (tn: 65119) Applicant's Data Response, Set 1C-3. Fire Risk Assessment. 5/08/2012

HHSG 2011a – BrightSource Energy/J. Woolard (tn: 61756) Application for Certification, Volume 1 & 2. 08/5/2011

HHSG 2011b – BrightSource Energy/C. Jensen (tn: 62125) Supplement to AFC for HHSEGS. 09/07/2011

HHSG 2011c – BrightSource Energy/C. Jensen (tn: 62322) AFC Supplement B.  
09/23/2011

SIFPD2012a – Southern Inyo Fire Protection District (tn: 65013) Request for Listing of  
Interested Agency. 04/30/2012 -- Ross letter

VF2010 – State of California—Health and Human Services Agency California,  
Department of Public Health, Coccidioidomycosis Yearly Summary Report, 2001  
– 2010

**WORKER SAFETY / FIRE PROTECTION**

**List of Comment Letters**

		<b>WS/FP Comments?</b>
1	Inyo County	
2	Bureau of Land Management	
3	National Park Service	
4	The Nature Conservancy	
5	Amargosa Conservancy	
6	Basin & Range Watch	
7	Pahrump Paiute Tribe	
8	Richard Arnold, Pahrump Piahute Tribe	
9	Big Pine Tribe of Owens Valley	
10	Intervenor Cindy MacDonald	<b>X</b>
11	Intervenor Center for Biological Diversity	
12	Intervenor, Old Spanish Trail Association	
13	Applicant, BrightSource Energy, Inc.	<b>X</b>

<b>Comment #</b>	<b>DATE</b>	<b>COMMENT TOPIC</b>	<b>RESPONSE</b>
<b>10</b>	<b>July 21, 2012</b>	<b>Intervenor Cindy MacDonald</b>	
<b>10.1</b>	<b>p. 2-5</b>	<p>"Fire and Emergency Services" -- The applicant's intent to utilize Nevada for fire and emergency services has initiated jurisdictional disputes. It may also increase property taxes to landowners in the vicinity through provisions contained within the California Constitution, Section XIII A, sections 13910 through 13916. As a result, the infrastructure requirements for functional fire and emergency medical services necessary to protect and insure the public interest and safety in and around the proposed Hidden Hills Solar Electric Generating System site cannot be considered reasonably available.</p>	<p>Staff notes that the local fire department has indentified impacts to emergency services from the project. This is "drawdown," where exisiting emergency service users may not get their current level of emergency services if local resources are having to repond to emergencies relating to the power plant. Staff is recommending adoption of conditions of certification that would address these issues prior to start of construction. These agreements might include reliance on formal mutual aid agreements and new infrastructure, but would have to mitigate the effects of drawdown such that local residents could expect their current levels of emergency services. Concerns about increased parcel taxes are speculative.</p>



<b>Comment #</b>	<b>DATE</b>	<b>COMMENT TOPIC</b>	<b>RESPONSE</b>
<b>13</b>	<b>July 23, 2012</b>	<b>Applicant, BrightSource Energy, Inc.</b>	
<b>13.2</b>	<b>p. 331</b>	suggested change to PSA page 4.16-15 SIFPD Impacts, after 1st paragraph, request to insert text explaining Applicant's interpretation of the difference in designs of their proprietary "power tower" technology and parabolic trough technology.	Staff included in the <b>FSA</b> a discussion of the effect of absence of HTF.
<b>13.3</b>	<b>p. 332</b>	suggested change to PSA page 4.16-17 SIFPD Impacts, after 1st paragraph. Applicant feels 0.83 emergencies per plant per year does not constitute "significant" even in desert environment and objects to staff's assessment otherwise	Staff recognizes that an expected number of incidents cannot be determined from the existing, incomplete data. Whether higher levels of calls might occur remains unknown. Existing data is taken from smaller solar power plants and may not be predictive of the current siting case. The existing data does not include potential impacts on EMS services that would result from increased worker commute traffic. These impacts would be affected by the nature of the roads used, commute times, weather, etc. Finally, the significance of any impacts would depend on the resources and level of service demands on the local responders.
<b>13.4</b>	<b>p. 332</b>	suggested change to PSA page 4.16-17 SIFPD cts,last paragraph, 3rd Sentence, regarding response time, applicant recommends "approximately 40 minutes" be used instead of stated "30 to 50 minutes"	Staff prefers the added information provided by the estimated range of response times. Estimated ranges would be affected by experience of affects resulting from road conditions, weather, volunteer availability, etc.
<b>13.5</b>	<b>p. 332</b>	suggested change to PSA page 4.16-18 SIFPD Impacts,last paragraph, 3rd Sentence, regarding response time, applicant recommends "approximately 40 minutes" be used instead of stated "30 to 50 minutes" -- and that this is not a significant impact. Moreover, state this is an "economic" not "environemntal" issue and therefore <u>not</u> an impact under CEQA.	Staff prefers the added information provided by the estimated range of response times. Staff considers that an incident requiring a large response at the proposed project for a prolonged duration, which might leave the fire department unable to effectively respond to emergency needs of the public, would be significant.

**Appendix 1 -- PSA Response to Comments, Worker Safety / Fire Protection**

<b>13.6</b>	<b>p. 332</b>	question regarding PSA page 4.16-19 Emergency Medical Services Response, 2nd paragraph, 3rd sentence: is this only for the construction period?	Certainly the construction period creates the highest demand; needs beyond construction will be resolved by Conditions of Certification <b>Worker Safety-6</b> and <b>-7</b> .
<b>13.7</b>	<b>p. 332</b>	question regarding PSA page 4.16-20 Cumulative Impacts, 1st paragraph, 1st Sentence: which facilities are being referred in this first sentence, and are they within the SIFPD service area?	Potential issues will be resolved by Conditions of Certification <b>Worker Safety-6</b> and <b>-7</b> .